

FIG. 1.

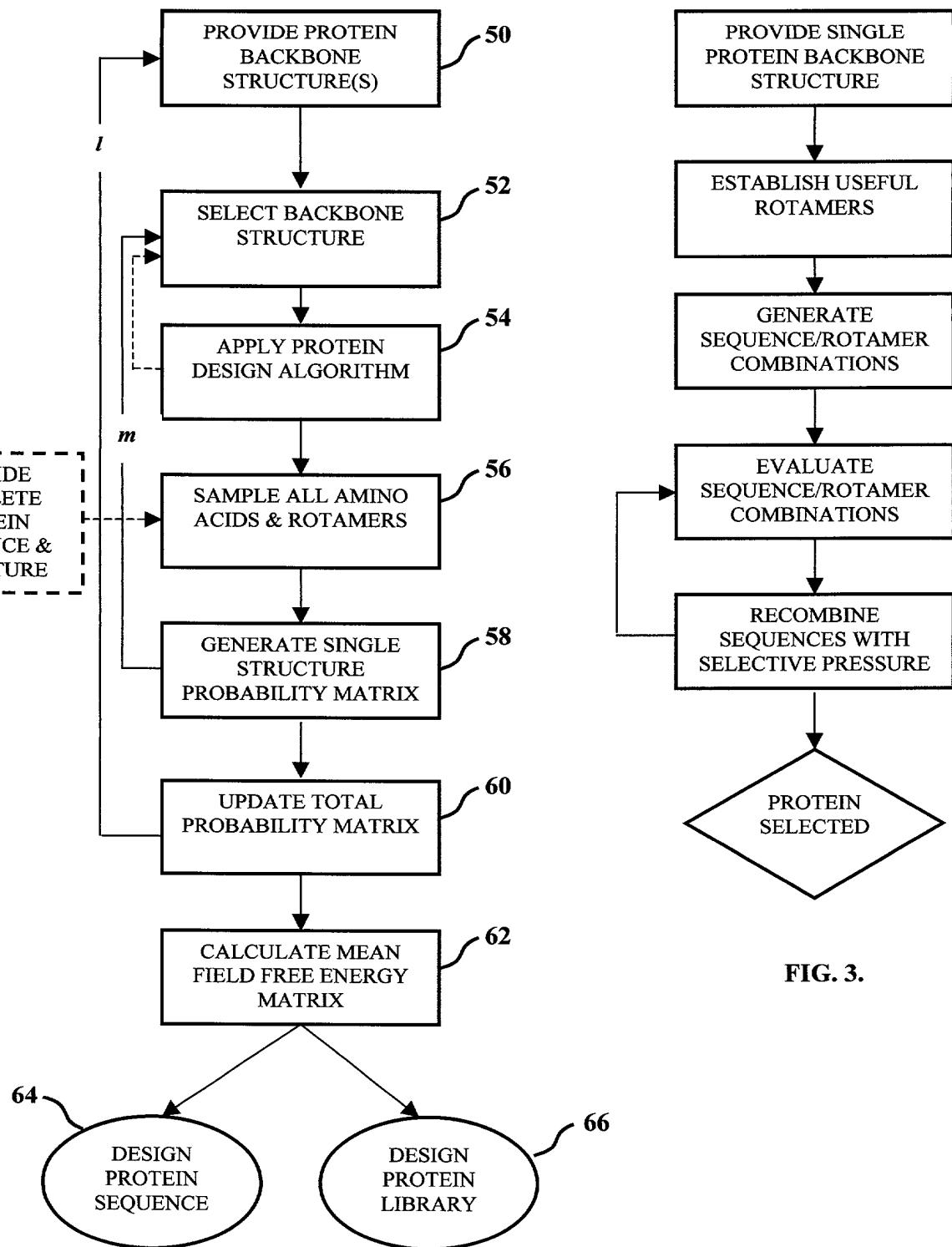
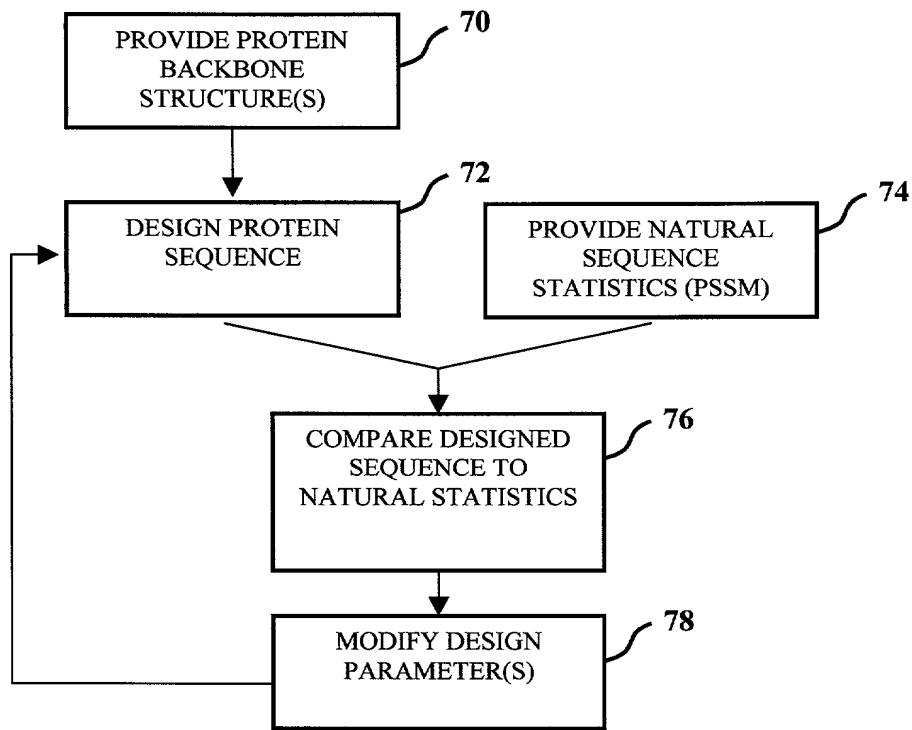


FIG. 2.

FIG. 3.



**FIG. 4.**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
A	1.7	10	4.9	2	16	17	6.5	4.9	4.8	4.2	3.8	0.5	1.9	4.7	1.7	3.5	4.6	18	8.7	10	7.7	3.6	3.5	4.8	3.9	4.1	3.8	9.1	2.1	3.9	6	10	5.3	4.7	
C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
D	0.7	17	7.1	4	20	50	5.8	3.7	3.5	9.2	8.2	2.4	3.5	0.3	0.4	4.7	5.4	20	19	6.2	5.8	2.4	5.4	0.7	2.9	7.5	4.6	1.2	4.4	2.3	17	7.7	0.2		
E	1.5	16	6.5	2.6	20	20	3.7	2.3	2.3	5.1	4.7	4.2	1	3.5	3.5	19	18	6.8	13	1.7	2	5.5	3.2	2.2	3.3	8.8	2.3	3	4.4	17	5.7	1.9			
F	50	9.5	20	50	20	3.8	17	7.1	7.2	8	4.1	50	50	20	50	3.9	7	2	2.3	3.1	20	5.8	14	20	50	5	11	17	50	20	9.3	16	7.9	50	
G	3.9	4.1	7.7	4.4	0	20	12	8.9	13	8.9	11	2.8	0.9	8.1	2.8	9.3	6.8	20	18	19	19	8.7	8.2	11	3.1	10	6.1	14	14	6	9	19	10	7.4	
H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
I	50	8.6	7.8	15	20	11	5.4	4	8.7	4.9	6.2	50	50	19	50	4.1	5.1	16	11	11	17	4.9	3	10	50	2.3	2.1	7.3	6.6	6.7	5.8	14	4.8	50	
K	4.8	6.7	7.1	6	17	18	6.2	2	2.8	2.0	7.5	6.1	9.3	4.6	4	5.5	15	10	7.9	5.2	0.6	3	5.9	3.5	3.1	1.3	4.7	3	4.3	2.6	14	5.8	6.5		
L	50	0.3	9.5	20	19	9.2	4	4.7	1.1	4.3	3.4	50	50	9.6	50	5.5	7.3	11	5.1	7.9	8.4	3.4	5.2	7.5	50	5.4	4.3	7.8	50	8.4	4.6	17	5.3	50	
M	50	3.1	11	14	19	11	7	7.9	5.9	6.1	6.9	50	50	15	50	6	6.8	12	4.9	9.5	6.1	6.3	7.4	12	50	8.5	5.5	6.6	6.7	11	6.4	16	7.1	50	
N	0.6	20	5.9	4	19	50	6.4	2.8	3.3	7.1	5.1	3.6	3.4	1.3	0.8	3.7	4.4	20	14	14	2.8	3	4.8	1	3.6	6.1	5.5	0.2	3.9	1.6	15	4.9	1		
P	11	20	0.4	7.1	20	20	2.2	20	6.7	20	5.3	20	20	4.9	20	20	20	18	20	20	9.6	18	20	20	5.7	17	2.5	17	4.6	0.2	20	8.7			
Q	2.8	11	6.2	4.2	19	20	4.9	1.8	2	3.6	2.7	5.4	4.2	4	2.4	2.2	3.5	15	15	5.7	5.3	1.3	26	5.6	4	1.8	2	1.2	3.4	3.6	1.6	16	6.1	3.5	
R	2.6	11	5.5	4.6	18	20	6.3	2.5	2.4	2.7	3	5.4	4.4	8.3	2.2	3.4	4.8	18	17	11	3.9	1.9	3.2	5.8	4.4	2.1	2	6.6	3.6	2.4	1	16	5.7	3.6	
S	0.4	9.6	6.4	0.7	18	20	5.3	5.2	3.4	4.5	4.1	0.8	0.3	3.6	1	1.5	2.3	20	13	50	3.1	3.8	2.9	1	3.3	3.1	4.8	6.1	2.6	13	2.4	12	5.3	2.1	
T	3.8	7.7	11	4.8	20	18	0.2	4.1	6.3	1.4	4.4	6.2	6.7	9.2	2.4	0.5	0	19	9.8	50	10	3.1	0.6	0	8.4	1.7	14	0.3	3	3.7	0.1	3	10	0	2.6
V	50	9.2	10	10	20	11	2.6	2.2	6.4	2.6	3.6	50	50	17	50	2	1.6	17	12	8	9	11	2	2.6	5.7	50	0.8	0.5	4.8	5.8	6.6	2.6	7.6	2.7	50
W	50	14	20	50	20	0.3	20	15	11	12	9.9	50	50	18	50	5.3	15	5	6.1	7.2	18	20	16	14	50	9.9	14	17	50	20	16	18	15	50	
Y	50	8.7	18	50	19	4	20	8.7	5.4	6.4	2.8	50	50	20	50	3.1	14	0.2	14	0.6	20	3.6	11	50	50	9.6	50	20	8.9	15	9.8	50			

FIG. 5.

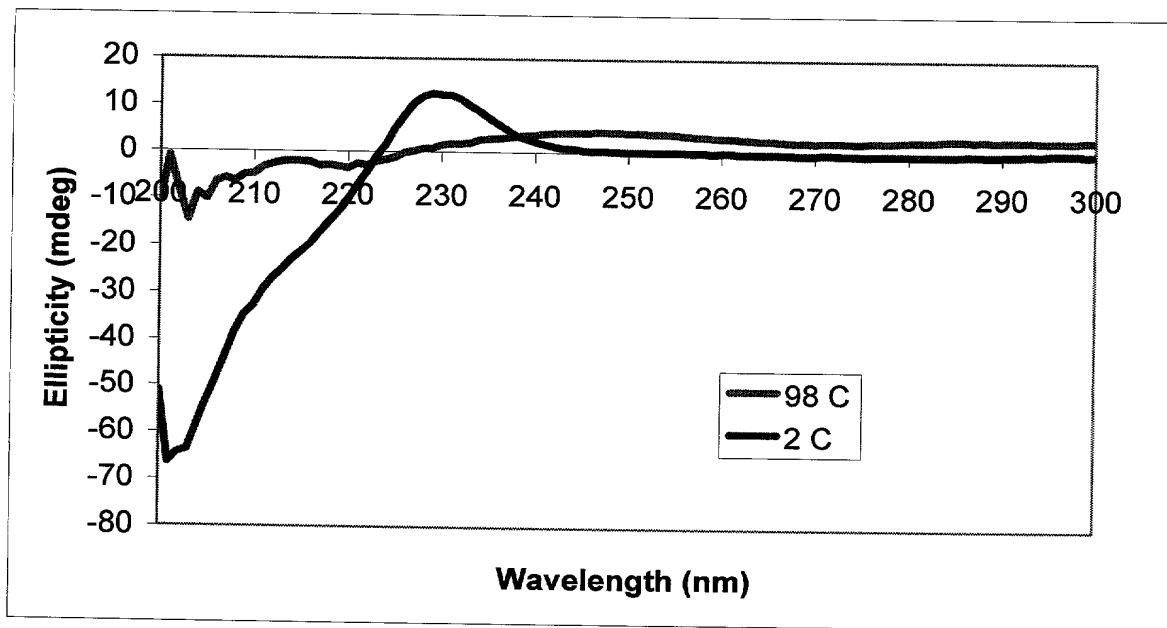


FIG. 6.

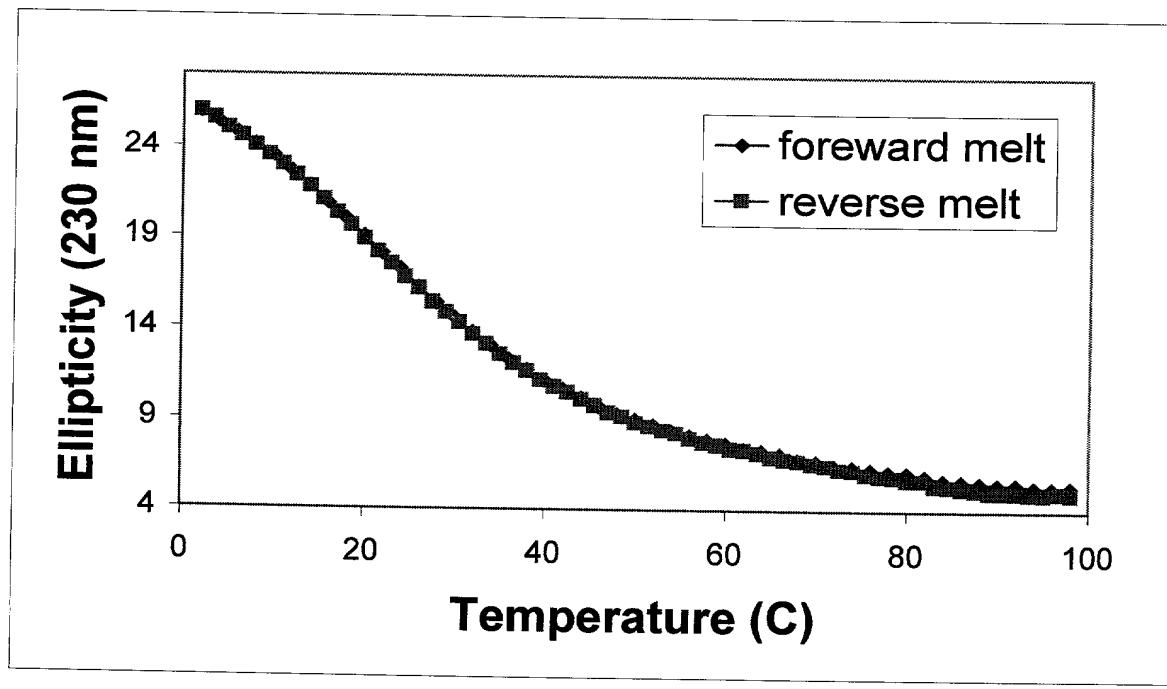


FIG. 7.

**FIG. 8A.**

library design using free energy limits

complexity  $\sim 10^5$

SLPSGWTQLTKASDDTTYYYNKTTDVVTNTRPTD  
N K K SG N Q SN K N N  
D P E Q  
V S  
E  
R

**FIG. 8B.**

complexity  $\sim 10^8$

SLPSGWTQLTKASDDTTYYYNKTTDVVTNTRPTD  
N KQK SGNNSV F Q SNTKQD N N  
D P E E QT Q  
E V S  
E  
R  
N

**FIG. 8C.**

library design using probability limit

complexity  $\sim 10^5$

SLPSGWTQLTKASDDTTYYYNKTTDVVTNTRPTD  
N K K SGNN V F Q SN KQ N N  
D

**FIG. 8.**